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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. 478SC

First Inventor or Application Identifier Paul J. Dow

Title Carburetor Valve Assembly

Express Mail Label No. EL86017086US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 18]
(preferred arrangement set forth below)
- Descriptive title of the invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the invention
 - Brief Summary of the invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 3]
4. Oath or Declaration [Total Pages 4]
- a. ☒ Newly executed (original or copy)
- b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
- i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
- a. ☐ Computer Readable Copy
- b. ☐ Paper Copy (identical to computer copy)
- c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement of Power of Attorney (when there is an assignee)
9. ☐ English Translation Document (if applicable)
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 [Copies of IDS Citations]
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
13. ☐ * Small Entity Statement filed in prior application, Status still proper and desired (PTO/SB/09-12)
14. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
15. ☒ Other: Power of Attorney

* NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. _____ / _____

Prior application information: Examiner _____ Group / Art Unit: _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

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October 31, 2000

Box New Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Enclosed herewith for filing is a new patent application entitled

CARBURETOR VALVE ASSEMBLY

This application is being filed pursuant to the revised Rules of Practice effective February 27, 1983 by the undersigned attorney of the applicant. It is respectfully requested that this application be assigned a filing date of October 31, 2000 pursuant to the "Express Mail" (EL686017086US) provision of 37 C.F.R. § 1.10 as amended.

The name and addresses of the inventors of the subject matter of the enclosed patent application are as follows:

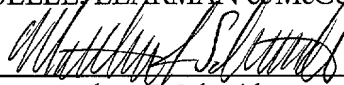
Paul J. Dow
6259 Seeger Road
Cass City, Michigan 48726

Please forward to the undersigned attorney all correspondence in connection with this application. We await receipt of a filing date and serial number for this application.

Respectfully submitted,

REISING, ETHINGTON, BARNES,
KISSELLE, LEARMAN & McCULLOCH, P.C.

By


Matthew J. Schmidt, #43,904

MJS/tw
Enclosures

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FEE TRANSMITTAL for FY 1999

Patent fees are subject to annual revision

Small Entity payments must be supported by a small entity statement,
otherwise large entity fees must be paid See Forms PTO/SB/09-12
See 37 C.F.R. §§ 1.27 and 1.28

TOTAL AMOUNT OF PAYMENT (\$ 786

Complete if Known

Application Number	n/a
Filing Date	n/a
First Named Inventor	Paul J. Dow
Examiner Name	n/a
Group / Art Unit	n/a
Attorney Docket No	478SC

METHOD OF PAYMENT (check one)

- 1.
- ☒
- The Commissioner is hereby authorized to charge indicated fees and credit any over payments to

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Deposit Account Name Reising, Ethington

☐ Charge Any Additional Fee Required Under 37 CFR §§ 1.16 and 1.17

- 2.
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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
101 760	201 380	Utility filing fee	710
106 310	206 155	Design filing fee	
107 480	207 240	Plant filing fee	
108 760	208 380	Reissue filing fee	
114 150	214 75	Provisional filing fee	

SUBTOTAL (1) (\$ 710

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
22	-20** = 2	x 18 =	36
Independent Claims	2 - 3** =	x	
Multiple Dependent			

**or number previously paid, if greater, For Reissues, see below

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
103 18	203 9	Claims in excess of 20	
102 78	202 39	Independent claims in excess of 3	
104 260	204 130	Multiple dependent claim, if not paid	
109 78	209 39	** Reissue independent claims over original patent	
110 18	210 9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) (\$ 36

FEE CALCULATION (continued)

3. ADDITIONAL FEES

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105 130	205 65	Surcharge - late filing fee or oath	
127 50	227 25	Surcharge - late provisional filing fee or cover sheet	
139 130	139 130	Non-English specification	
147 2,520	147 2,520	For filing a request for reexamination	
112 920*	112 920*	Requesting publication of SIR prior to Examiner action	
113 1,840*	113 1,840*	Requesting publication of SIR after Examiner action	
115 110	215 55	Extension for reply within first month	
116 380	216 190	Extension for reply within second month	
117 870	217 435	Extension for reply within third month	
118 1,360	218 680	Extension for reply within fourth month	
128 1,850	228 925	Extension for reply within fifth month	
119 300	219 150	Notice of Appeal	
120 300	220 150	Filing a brief in support of an appeal	
121 260	221 130	Request for oral hearing	
138 1,510	138 1,510	Petition to institute a public use proceeding	
140 110	240 55	Petition to revive - unavoidable	
141 1,210	241 605	Petition to revive - unintentional	
142 1,210	242 605	Utility issue fee (or reissue)	
143 430	243 215	Design issue fee	
144 580	244 290	Plant issue fee	
122 130	122 130	Petitions to the Commissioner	
123 50	123 50	Petitions related to provisional applications	
126 240	126 240	Submission of Information Disclosure Stmt	
581 40	581 40	Recording each patent assignment per property (times number of properties)	40
146 760	246 380	Filing a submission after final rejection (37 CFR § 1.129(a))	
149 760	249 380	For each additional invention to be examined (37 CFR § 1.129(b))	

Other fee (specify) _____

Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ 40

SUBMITTED BY

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CARBURETOR VALVE ASSEMBLY

5

Field of the Invention

This invention relates generally to carburetors and more particularly to a throttle valve assembly for a carburetor.

10

Background of the Invention

Current throttle valves for carburetors have a metallic cam plate fastened to a metal shaft extending into the carburetor body and upon which a valve head is fixed to control the flow of air through the carburetor in response to rotation of the valve head. The cam plate is engageable with one or more stops on the carburetor body to limit rotation of the throttle valve assembly between idle and wide open throttle positions. The cam plate, shaft and valve head are machined and plated stamped parts. The cam plate is attached to the shaft with either a threaded fastener or by swaging over a portion of the shaft extending through the cam plate. The valve head may be a disc, such as in a butterfly-type valve arrangement, with the disc attached to the shaft with a threaded fastener. The machined or stamped components are relatively expensive to produce. Further, the use of threaded fasteners to connect the valve head to the shaft, and the cam plate to the shaft or the swaging of the shaft onto the cam plate greatly increases the cost, difficulty, time and labor required to assemble the throttle valve assembly.

20

Some carburetors have choke valves which may be closed to restrict the flow of air through the carburetor to facilitate starting of an associated engine. The choke valve may have a metal shaft extending into the carburetor body and a metal valve disc attached thereto by a threaded fastener which is received in and rotatable in the fuel and air mixing passage of the carburetor. The valve disc is rotated between a closed position substantially restricting air flow past the valve disc and an open position permitting a substantially unrestricted flow of air through the fuel and air mixing passage. Some choke valves have a plastic one-piece shaft with an integral handle which may be grasped by a user and rotated to move the choke valve between its open and closed positions. The valve disc may be press-fit into a slot formed through the shaft.

Summary of the Invention

A carburetor with a throttle valve assembly having a plastic cam body connected to a plastic shaft which extends into the carburetor body and a valve head received in a slot formed through the plastic shaft. Desirably, the valve assembly eliminates the use of threaded fasteners and the need to swage or otherwise deform any of the components to connect them together. Desirably, the shaft and cam body are constructed and arranged to prevent relative rotation between them. This permits accurate location of the cam body on the shaft and facilitates calibration of the throttle valve assembly between its idle and wide open throttle positions. Further, the characteristics of the throttle valve assembly can be changed by simply providing a

cam body having a different shape or construction with the shaft or valve head being the same for a wide range of carburetors. Still further, the slot in the shaft is preferably longer than the diameter of the valve head so that the valve head may shift axially on the shaft so that it is self-centering within the fuel and air mixing passage.

- 5 The valve head can preferably also shift laterally relative to the shaft. This greatly facilitates assembly and manufacture of the throttle valve assembly by greatly increasing the tolerances with respect to the location of the valve head on the valve shaft and of the slot receiving the valve head.

Objects, features and advantages of this invention include providing a valve assembly which utilizes a plastic cam body connected to a plastic shaft, permits different cam bodies to be used with the same shaft and valve disc for different carburetors, self-centers and assures smooth movement of the valve disc within the fuel and air mixing passage, is lightweight and inexpensive to manufacture and assemble, eliminates the use of machined or stamped metal components for at least the shaft and cam body, eliminates the use of threaded fasteners or mechanical deformation such as swaging to connect components together, has improved corrosion resistant characteristics, reduces the time and cost to assemble the throttle valve assembly into a carburetor, is reliable, durable, rugged and in service has a long, useful life.

Brief Description of the Drawings

These and other objects, features and advantages of this invention will be apparent from the following detailed description of the preferred embodiment and best mode, appended claims and accompanying drawings in which:

5 FIG. 1 is an end view of a carburetor having a throttle valve assembly according to the present invention;

FIG. 2 is a side view of the carburetor of FIG. 1;

FIG. 3 is a cross-sectional view taken generally along lines 3 – 3 of FIG. 2;

10 FIG. 4 is an enlarged fragmentary sectional view taken generally along line 4 – 4 of FIG. 3;

FIG. 5 is a side view illustrating a throttle cam body connected to a throttle shaft;

FIG. 6 is an end view of the cam body and shaft;

15 FIG. 7 is an enlarged end view of the cam body;

FIG. 8 is a cross sectional view of the cam body taken generally along line 8 – 8 of FIG. 7;

FIG. 9 is a fragmentary sectional view taken generally along line 9 – 9 of FIG. 7;

20 FIG. 10 is a side view of the throttle shaft;

FIG. 11 is an end view of the throttle shaft;

FIG. 12 is an enlarged fragmentary view of an end portion of the throttle shaft;

FIG. 13 is an enlarged fragmentary cross-sectional view illustrating the connection between the throttle shaft and cam body;

FIG. 14 is a plan view of a valve disc; and

FIG. 15 is a side view of the valve disc of FIG. 14.

Detailed Description of the Preferred Embodiment

Referring in more detail to the drawings, FIGS. 1 – 3 illustrate a carburetor 10 having a throttle valve assembly 12 including a valve head 14 rotatably carried by a shaft 16 within a fuel and air mixing passage 18 of the carburetor 10 to control fluid flow therethrough. Rotation of the throttle valve assembly 12 is typically accomplished by a Bodén cable and wire assembly (not shown) which is attached to and drives a throttle cam body 20 connected to the shaft 16 for rotation therewith. The throttle valve assembly 12 rotates from an idle position as shown in FIG. 1, substantially preventing fluid (namely, air) flow through the fuel and air mixing passage 18, and a wide open throttle position permitting a substantially unrestricted flow of fluid through the fuel and air mixing passage 18. In general, as shown in FIG. 3, fuel is discharged into the fuel and air mixing passage 18 from a fuel metering chamber 22 which receives fuel through a diaphragm actuated inlet valve 24 which selectively communicates the fuel metering chamber 22 with a diaphragm-type

fuel pump 26 which draws fuel from a fuel tank for delivery to the fuel metering chamber 22. Fuel discharged from the fuel metering chamber 22 into the fuel and air mixing passage 18 is mixed with air flowing therethrough and is delivered to the engine in proportion to the engine's fuel demand to support engine operation over a wide range of operating conditions. The construction and operation of the fuel metering chamber 22, valve 24, fuel pump 26, and related components may be as disclosed in U.S. Patent No. 4,752,420, the disclosure of which is incorporated herein by reference in its entirety.

The throttle valve assembly 12 has the shaft 16 which extends through a bore 28 through a body 30 of the carburetor 10 at a right angle to and intersecting the fuel and air mixing passage 18. A split ring retainer 32 cooperates with a groove 34 at a first end 36 of the shaft 16 projecting from the carburetor body 30 to retain the shaft 16 within the body 30. As best shown in FIGS. 5, 6 and 10 – 12, the shaft 16 is generally cylindrical with a second end 38 constructed to be disposed within a complementary recess or passage 40 in the cam body 20. Adjacent the second end, a pair of flat sides 42, 44 are formed on opposite sides of the shaft 16. A groove 46 is formed at least in part around the shaft 16 inboard of its second end 38 and within the area of the flat sides 42, 44. An elongate slot 48 formed through the shaft 16 between its ends 36, 38 is constructed to receive the valve head 14 therein to connect them together. The shaft 16 is preferably formed of a plastic or polymeric material and may be readily molded such as by an injection molding or other molding process.

As best shown in FIGS. 6 – 9, the cam body 20 has a generally tubular barrel portion 50 having a non-circular recess or passage 40 in which the second end 38 of the shaft 16 is pressed to connect the cam body 20 and shaft 16 together. At least a portion of the passage 40 is defined by at least two and preferably four flat surfaces or shoulders 52 which, in assembly, bear on and engage the flat sides 42, 44 of the shaft 16 to prevent relative rotation between the shaft 16 and cam body 20. A plate portion 54 of the cam body 20 extends outwardly from the barrel portion 50 and defines two stop surfaces 56, 58 engageable with associated stops 60, 62 carried by the carburetor body 30 to limit rotation of the throttle valve assembly 12. Preferably, at least one of the stops 60 of the carburetor body 30 is adjustable and as shown, is defined by a conical end of a screw 66 which may be advanced or retracted relative to the carburetor body 30 to change the location of engagement between the cam body stop 56 and the carburetor body stop 60 defined by the end of the screw 66. Accordingly, the circumferential spacing between the stops 56, 58 of the cam body 20 as well the location of the stops 60, 62 on the carburetor body 30 determines the amount of rotation of the throttle valve assembly 12 between its idle and wide open throttle positions. Desirably, a spring 68 which bears on the cam body 20 yieldably biases the throttle valve assembly 12 to its idle position as shown in FIGS. 1 – 3. One or more holes 70 are preferably provided through the plate 54 spaced from the barrel portion 50 to facilitate connection with the wire of the Boden wire cable assembly (not shown) which drives the throttle valve assembly 12 for rotation. A hole 71 may

receive one finger or end of the spring 68 which yieldably biases the throttle valve assembly 12 to its idle position.

As best shown in FIGS. 8 and 9, to retain the cam body 20 on the shaft 16 and prevent their inadvertent separation, the cam body 20 has at least one and preferably a plurality of barbs or tabs 72 extending radially inwardly from an inner wall 74 of the barrel 50 into the passage 40. In assembly, the cam body 20 is pressed onto the shaft 16 until the tabs 72 pass over the second end 38 of the shaft 16 and are received within the groove 46 adjacent to the second end 38 to retain the cam body 20 on the shaft 16 with an interference fit. The cam body 20 is preferably formed of a plastic or polymeric material and may be molded separately from the shaft 16 to permit different cam bodies to be used with the same shafts for different carburetor applications. Alternatively, the shaft 16 and cam body 20 may be integrally formed together in one piece to eliminate the need for the structures preventing relative rotation between the shaft 16 and cam body 20 and the structures retaining the them together.

As best shown in FIGS. 4, 14 and 15, the valve head 14 is preferably a generally flat circular plate or disc which may be formed of a metallic or polymeric material. The valve head 14 has a plurality of raised, inclined retainer tabs 80, 81 preferably integrally formed therewith. Desirably, as shown in FIG. 15, the tabs 80, 81 are laterally spaced from the center of the valve head 14 and have ramps 82 leading to opposing stop surfaces 84 constructed to bear on the throttle shaft 16 to retain the

valve head 14 in the slot 48 of the shaft 16. In assembly, the valve head 14 is pressed or pushed into the shaft 16 until the tab or tabs 80 on one side of the valve head 14 are forced through the slot 48 and the shaft 16 is received between the opposed laterally spaced tabs 80, 81. Desirably, due to the inclined or ramp surfaces 82 of the tabs 80, 81 it is relatively easy to push the valve head 14 into the slot 48 in shaft 16. However, it is difficult to remove the valve head 14 from the shaft 16 due to the abrupt stop surfaces 84 which oppose such movement of the valve head 14. Accordingly, inadvertent separation of the valve head 14 and shaft 16 is prevented.

Desirably, the valve head 14 is slidably carried by the shaft 16 so that it is self-centering within the fuel and air mixing passage 18. To accomplish this, the slot 48 formed in the shaft 16 preferably has a length greater than the diameter of the valve head 14 to permit shifting of the valve head 14 axially relative to the shaft 16. The slot also has a length at least equal to and preferably greater than the diameter of the fuel and air mixing passage 18 with the slot 48 spanning the entire fuel and air mixing passage 18 so that the valve head 14 is self-centering therein. Further, to permit lateral shifting of the valve head 14 relative to the shaft 16 and thereby further enable the valve head 14 to center itself in passage 18, the distance between the stop surfaces 84 of the opposed laterally spaced tabs 80, 81 is preferably greater than the outer diameter of the shaft 16. In this manner, the tolerances of the valve head 14 and shaft 16 are greatly increased to facilitate their manufacture and assembly both with respect to each other and their assembly into the carburetor 10.

The shaft 16, cam body 20 and valve head 14 may be formed from any suitable polymeric material with currently preferred materials including, without limitation, acetal copolymers such as those sold under the trademarks Delrin 500 and Celcon M-90. The valve head 14 may also be formed of brass or other metal.

5 Desirably, the throttle valve assembly 12 can be assembled without the use of any fasteners, adhesives or the like. Further, the use of machined, stamped or other costly to manufacture components can be at least substantially reduced, and preferably eliminated. Still further, the valve head 14 and shaft 16 can be used with a wide range of cam bodies 20 to increase the versatility of the throttle valve assembly 12 for a wide range of carburetors 10 and engine applications. Accordingly, the cost to manufacture and assemble the throttle valve assembly 12 itself as well as to install the throttle valve assembly 12 into a carburetor 10 is significantly reduced. The polymeric materials are also cheaper and have greater resistance to corrosion than their metal counterparts.

What is claimed is:

1.

A carburetor, comprising:

a carburetor body having a fuel and air mixing passage through which air flows and through which fuel is delivered to an engine;

a valve assembly moveable in the fuel and air mixing passage between first and second positions, said valve assembly having a polymeric shaft rotatable relative to the carburetor body, a polymeric cam body connected to the shaft for rotation with the shaft and a valve head in communication with the fuel and air mixing passage and carried by the shaft for rotation with the shaft.

2.

The carburetor of claim 1 wherein the shaft has an elongate slot formed therethrough and the valve head is carried by the shaft within the slot.

3.

The carburetor of claim 2 wherein the valve head has raised tabs which are engagable with the shaft to retain the valve head in the slot.

4.

1 The carburetor of claim 3 wherein the tabs define stop surfaces with at
2 least one stop surface disposed on each of a pair of opposed sides of the shaft in
3 assembly with the distance between the stop surfaces on opposed sides of the shaft
4 being greater than the diameter of the shaft.

5.

1 The carburetor of claim 2 wherein the valve head is generally circular
2 and the slot has a length greater than the diameter of the valve head so that the valve
3 head can shift within the slot generally axially relative to the shaft.
4

6.

1 The carburetor of claim 5 wherein the length of the slot is at least equal
2 to the diameter of the fuel and air mixing passage with the slot spanning the entire fuel
3 and air mixing passage.

7.

1 The carburetor of claim 1 wherein the cam body is integrally formed
2 with the shaft.

8.

1 The carburetor of claim 1 wherein the cam body is pressed onto the shaft
2 and is retained on the shaft by an interference fit.

9.

1 The carburetor of claim 1 wherein the shaft has a flat surface and the
2 cam body has at least one shoulder which engages the flat surface of the shaft to
3 prevent relative rotation between the shaft and cam body.

10.

1 The carburetor of claim 9 wherein the shaft has another flat surface and
2 the cam body has another shoulder which engages said another flat surface.

11.

1 The carburetor of claim 10 wherein the cam body has four spaced apart
2 shoulders with each flat surface engaged by two shoulders.

12.

1 The carburetor of claim 1 which also comprises a pair of stops carried by
2 the carburetor body and wherein the cam body has a pair of stops each constructed to

3 engage a separate one of the stops carried by the carburetor body to limit rotation of
4 the valve assembly.

13.

1 The carburetor of claim 8 wherein the shaft has a groove formed therein
2 and the cam body has a throughbore and a tab extending into the throughbore with the
3 tab constructed and arranged to be received in the groove when the cam body is fully
4 received on the shaft.

14.

1 A valve assembly for a carburetor having a body with a fuel and air
2 mixing passage, the valve assembly comprising:

3 a polymeric shaft rotatably carried by the carburetor body in
4 communication with the fuel and air mixing passage and having a slot formed
5 therethrough between its ends;

6 a cam body connected to the shaft for co-rotation with the shaft and
7 having a pair of integral stops constructed and arranged to engage stops on the
8 carburetor body to limit rotation of the valve assembly, and

9 a valve head carried by the shaft for rotation with the shaft, in
10 communication with the fuel and air mixing passage and disposed in part in the slot so

11 that rotation of the shaft changes the orientation of the valve head relative to the fuel
12 and air mixing passage to control fluid flow through the fuel and air mixing passage.

15.

1 The valve assembly of claim 14 wherein the valve head has at least two
2 spaced apart tabs and when assembled to the shaft at least one of said tabs is disposed
3 on each of a pair of opposed sides of the shaft to retain the valve head in the slot and
4 on the shaft.

16.

1 The carburetor of claim 14 wherein the valve head is generally circular
2 and the slot has a length greater than the diameter of the valve head so that the valve
3 head can shift within the slot generally axially relative to the shaft.

17.

1 The carburetor of claim 16 wherein the length of the slot is at least equal
2 to the diameter of the fuel and air mixing passage with the slot spanning the entire fuel
3 and air mixing passage.

18.

1 The carburetor of claim 14 wherein the shaft has a flat surface and the
2 cam body has at least one shoulder which engages the flat surface of the shaft to
3 prevent relative rotation between the shaft and cam body.

19.

1 The carburetor of claim 14 wherein the cam body is integrally formed
2 with the shaft.

20.

3 The carburetor of claim 14 wherein the cam body is pressed onto the
4 shaft and is retained on the shaft by an interference fit.

21.

1 The carburetor of claim 20 wherein the shaft has a groove formed
2 therein and the cam body has a throughbore and a tab extending into the throughbore
3 with the tab constructed and arranged to be received in the groove when the cam body
4 is fully received on the shaft.

1 The carburetor of claim 14 wherein the shaft has a portion with a non-
 2 circular cross-section constructed and arranged to be received in a complimentary non-
 3 circular recess in the cam body to prevent relative rotation between the shaft and the
 4 cam body.

ABSTRACT OF THE DISCLOSURE

A carburetor with a valve assembly having a plastic cam body connected to a plastic shaft which extends into the carburetor body and a valve head press-fit into a slot formed through the plastic shaft. Desirably, the valve assembly eliminates the use of threaded fasteners and the need to swage or otherwise deform any of the components to connect them together. Desirably, the shaft and cam body are constructed and arranged to prevent relative rotation between them. This permits accurate location of the cam body on the shaft and facilitates calibration of the throttle valve assembly between its idle and wide open throttle positions. Further, the characteristics of the throttle valve assembly can be changed by simply providing a cam body having a different shape or construction with the shaft and/or valve disc being the same for a wide range of carburetors. The slot in the shaft is preferably longer than the diameter of the valve disc so that the valve disc may shift axially relative to the shaft so that it is self-centering within the fuel and air mixing passage. The valve disc can preferably also shift laterally relative to the shaft. This greatly facilitates assembly and manufacture of the throttle valve assembly by greatly increasing the tolerances with respect to the location of the valve disc on the valve shaft and of the slot.

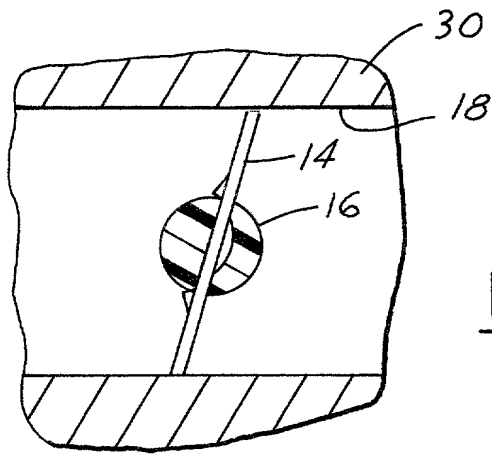


FIG. 4

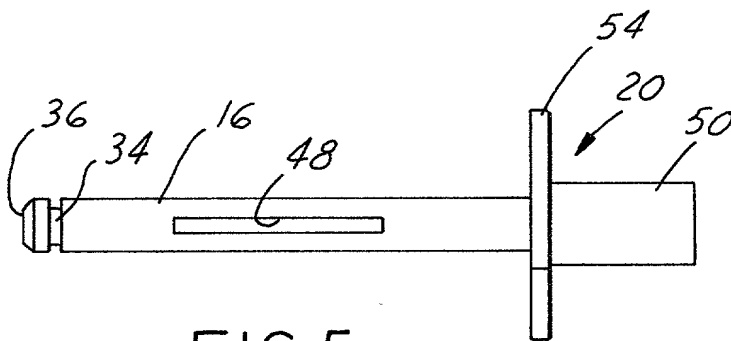


FIG. 5

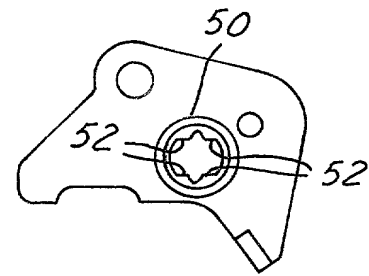


FIG. 6

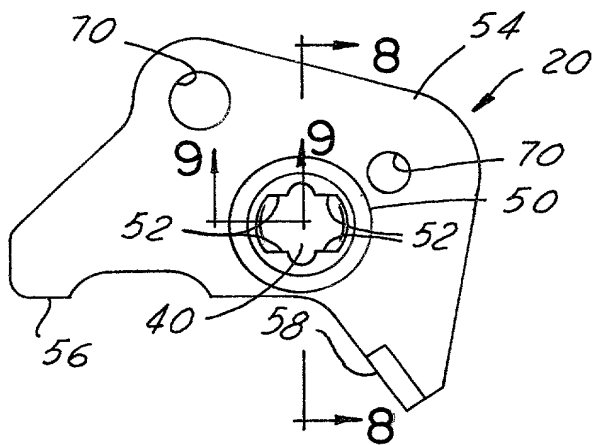


FIG. 7

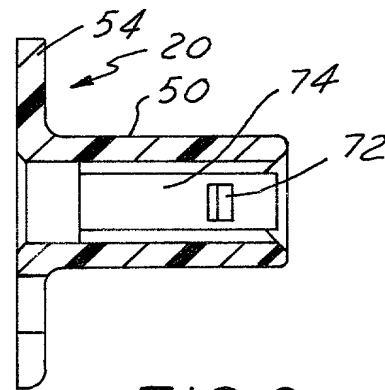


FIG. 8

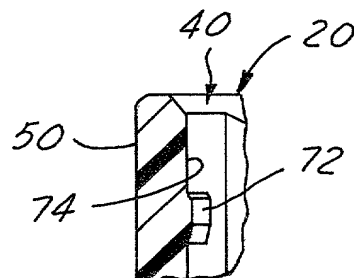


FIG. 9

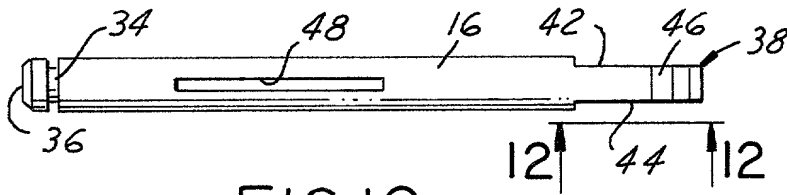


FIG. 10

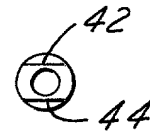


FIG. 11

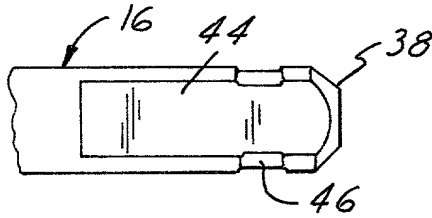


FIG. 12

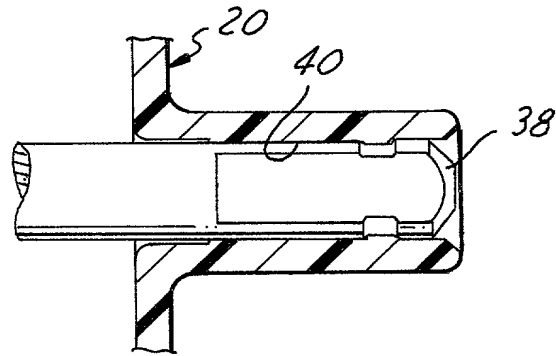


FIG. 13

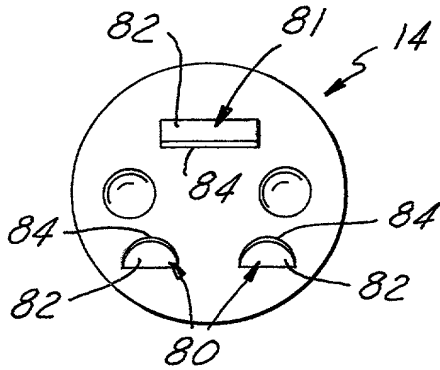


FIG. 14

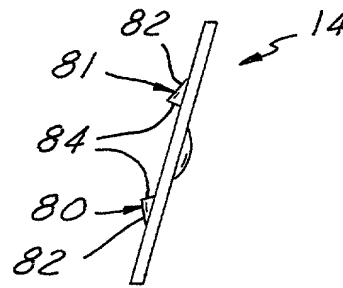


FIG. 15

DECLARATION FOR PATENT APPLICATION

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventors (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the **CARBURETOR VALVE ASSEMBLY**, the specification of which

xx is attached hereto.
 _____ was filed on _____
 as Application Serial No. _____
 and was amended on _____.
 (If Applicable)

I hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendments referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56, copy attached.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)**Priority Claimed**

Number	Country	Day/Month/Year	(Yes)	(No)
Number	Country	Day/Month/Year	(Yes)	(No)
Number	Country	Day/Month/Year	(Yes)	(No)
Number	Country	Day/Month/Year	(Yes)	(No)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Ser. No.	Filing Date	Status
Application Ser. No.	Filing Date	Status

I further declare that I do not know and do not believe that the invention claimed in this application was ever known or used by others in this country before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year prior to this application or any prior U.S. application above identified in which said invention may have been disclosed, or in public use or on sale in the United States of America for more than one year prior to this application or any prior U.S. application above identified in which said invention may have been disclosed.

POWER OF ATTORNEY

And I hereby appoint as my attorneys with full power of substitution to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith the following individual members and/or associates and/or counsel of the firm of

**REISING, ETHINGTON, BARNES, KISSELLE,
LEARMAN & McCULLOCH, P.C.**

P.O. Box 4390
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Phone: (248) 689-3500
Fax: (248) 689-4071

to which address please send all correspondence concerning this application:

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Robert C. Collins	27,430	John K. McCulloch	17,452
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John C. Evans	20,124	Steven L. Permut	28,388
Robert L. Farris	25,112	Matthew J. Schmidt	43,904
Francis J. Fodale	20,824	William J. Schramm	24,795
William H. Francis	25,335	Robert L. Stearns	36,937
William H. Griffith	16,706	James D. Stevens	35,691
Andrew M. Grove	39,697	William J. Waugaman	20,304
Richard W. Hoffmann	33,711	Charles R. White	20,494
Eric T. Jones	40,037		

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first joint inventor Paul J. Dow
First Middle Last

Inventor's Signature

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Date

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Citizenship

Post Office Address

Full name of third joint inventor _____
First Middle Last

Inventor's Signature

Date

Residence

Citizenship

Post Office Address

§1.56 Duty to disclose information material to patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application; and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a *prima facie* case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A *prima facie* case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent or inventor.

(35 U.S.C. 6, Pub. L. 97-247)

[42 FR 5593, Jan. 28, 1977, as amended at 47 FR 21751, May 19, 1982; 48 FR 2710, Jan. 20, 1983; 49 FR 554, Jan. 4, 1984; 50 FR 5171, Feb. 6, 1985; 53 FR 47808, Nov. 28, 1988, effective Jan. 1, 1989; 57 FR 2034, January 17, 1992, effective March 6, 1992]